

Gillian Chu

Email: gc3045@princeton.edu

Homepage: <https://gillichu.github.io/>

Education

Ph.D. Princeton University <i>Department of Computer Science</i> Advisor: Benjamin J. Raphael	Aug 2022 – May 2027 (Expected)
M.A. Princeton University <i>Computer Science</i> (earned en passant)	Aug 2022 – Dec 2024
M.S. University of Illinois at Urbana–Champaign <i>Program in Ecology, Evolution, and Conservation</i> Thesis: Phylogenetic Placement Advisor: Professor Tandy Warnow	Dec 2020 – Aug 2022
B.S. University of California, Berkeley Department of Computer Science	Aug 2016 – Dec 2020
H.S.D. Phillips Exeter Academy	Aug 2014 – May 2016

Research Interests

Computational Biology, Computational/Statistical Genetics, Probabilistic Graphical Models.
My interests are at the intersection of computer science, statistics, and biology. I design and build tools that help us understand the evolution of complex and heterogeneous biological systems.

Academic Honors and Fellowships

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- Computing Research Association – Widening Participation (CRA–WP) Conference (April 2025). *Awarded scholarship.*
 - National Cancer Institute: SSACB (2024). *Awarded Best Poster Runner-up.*
 - William G. Bowen Merit Fellowship (2023). *Internal Princeton fellowship.*
 - RECOMB–CCB Scientific Communications (2022) 1st Place (*Awarded \$200*).
 - NSF GRFP (2021–2026). *Five-year fellowship, three-year annual stipend of \$34,000.*
 - Excellent Graduate Student Instructor, UIUC. Spring 2021. *Introduction to Programming for Engineers and Scientists (CS101).*

Other Awards, Travel Grants, and Fellowships

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- School of Engineering and Applied Sciences (SEAS) Travel Grant Award (July 2026). *Internal Princeton Engineering Travel Grant. Awarded \$325.*
 - Intelligent Systems for Molecular Biology (ISMB, July 2026). *Conference Travel Fellowship. Awarded \$500.*
 - Irving Institute for Cancer Dynamics Intensive Workshop: Generative AI and Optimal Transport for Single Cell Data Integration (July 2026). Columbia University. *Awarded scholarship.*
 - National Science Foundation: STATGEN 2025. *Travel grant. Awarded \$173.23.*
 - Eric and Wendy Schmidt Center Symposium: Biomedical Science and AI (April 2025). *Travel grant. Awarded \$500.*
 - School of Engineering and Applied Sciences (SEAS) Travel Grant Award (May 2024). *Internal Princeton Engineering Travel Grant. Awarded \$375.*
 - Genetics Society of America: Presidential Membership Initiative (2022). *Awarded 1-year membership to GSA, Early Career Leadership Program and GENETICS Peer Review Training Program.*

Research Experience

Research Assistant, Princeton University Advisor: Benjamin J. Raphael	Aug 2022 – Present
• Designed framework using imaging-based observations for statistical inference of cell lineages.	

- Algorithmic design of protein-protein proximity-labeling experiments.
- Designed new evolutionary model to describe CRISPR-based dynamic lineage tracing data, and an efficient algorithm for maximum likelihood single-cell lineage tree inference.

Research Assistant, University of Illinois at Urbana–Champaign Jan 2021 – Present
Advisor: Tandy Warnow

- Designed fast multiple sequence alignment method capable of aligning ultra-large datasets.
- Designed fast and scalable phylogenetic placement methods.

Research Assistant, University of Illinois at Urbana–Champaign Jan 2021 – Dec 2021
Advisor: Mohammed El-Kebir

- Designing interactive visual editor for copy number calls in bulk tumor cell data.

Research Assistant, University of California, Berkeley Sept 2019 – May 2021
Advisor: Priya Moorjani

- Implemented an efficient method of uncovering founder events in modern populations.
- Designed an efficient and accurate local ancestry inference method.

Research Assistant, University of California, Berkeley Sept 2019 – Dec 2020
Advisor: Satish Rao

- Designed a distance-based phylogenetic tree inference algorithm.

Publications

* indicates joint first-author.

Conference Papers

1. **Chu, G.***, Schmidt, H.*, Raphael, B.J. “LAML-Pro: Joint Maximum Likelihood Inference of Cell Genotypes and Cell Lineage Trees.” ISMB 2026.
2. Mai, U.*, **Chu, G.***, Raphael, B.J. “Maximum Likelihood Inference of Time-scaled Cell Lineage Trees with Mixed-type Missing Data.” doi:10.1101/2024.03.05.583638. RECOMB 2024.
3. Lalani, Z.*, **Chu, G.***, Zaccaria, S., El-Kebir, M. “User-guided local and global copy-number segmentation for tumor sequencing data.” doi:10.1101/2022.01.15.476457v1. RECOMB–CCB 2022.

Journal Papers

1. **Chu, G.***, Schmidt, H.*, Raphael, B.J. “LAML-Pro: Joint Maximum Likelihood Inference of Cell Genotypes and Cell Lineage Trees.” *To appear in Bioinformatics*.
2. **Chu, G.***, Mai, U.*, Schmidt, H., Raphael, B.J. “Maximum Likelihood Inference of Time-scaled Cell Lineage Trees with Mixed-type Missing Data.” doi:10.1186/s13059-025-03649-9. *Genome Biology*, 2025.
3. **Chu, G.**, Warnow, T. “SCAMPP+FastTree: Improving Scalability for Likelihood-Based Phylogenetic Placement.” *Bioinformatics Advances*, 2023.
4. Park, M., Ivanovic, S., **Chu, G.**, Shen, C., Warnow, T. “UPP2: Fast and Accurate Alignment of Datasets with Fragmentary Sequences.” *Bioinformatics*, 2023.
5. Lalani, Z.*, **Chu, G.***, Hsu, S., Kagawa, S., Xiang, M., et al. “CNAViz: An interactive webtool for user-guided segmentation of tumor DNA sequencing data.” *PLOS Computational Biology*, 2022.
6. Tournebize, R., **Chu, G.**, Moorjani, P. “Reconstructing the history of founder events using genome-wide patterns of allele sharing.” *PLOS Genetics*, 2022.

Workshop Papers

1. Wang, Y., Sun, J., Wang, X., Wei, Y., Wu, H., **Chu, G.**, Yu, Z. “Sperax: An Approach to Defeat Long Range Attacks in Blockchains.” *IEEE INFOCOM Workshops*, 2020.

Presentations

- Contributed Talk, “LAML-Pro: Joint Maximum Likelihood Inference of Cell Genotypes and Cell Lineage Trees.” ISMB July 2026.
- Invited Talk, “Specialized phylogenetics models for single cells.” Host: Assistant Prof. Tiago Simoes,

Princeton University EEB. May 2026.

- Contributed Poster, “LAML-Pro: Joint Maximum Likelihood Inference of Cell Genotypes and Cell Lineage Trees.” Probabilistic Modeling in Genomics. March 2026. *Accepted, later withdrawn*.
- Contributed Talk, Computational Genomics Summer Institute: Trainee Talks. June 2025.
- Contributed Poster, “Precision Interactome Mapping to Decipher Protein-Drug Interactions in Cancer.” Princeton Catalysis Initiative May 2025.
- Invited Talk, “Reconstructing Time-resolved Cell Lineage Trees from Single-Cell Lineage Tracing Data.” STATGEN 2025: Conference on Statistics in Genomics and Genetics, Invited Session: Single-cell biology: New statistical frontiers across different omics. May 2025.
- Invited Talk, “Reconstructing Maximum Likelihood Time-resolved Cell Lineage Trees on Lineage Tracing Data.” Yale Student Theory Day. May 2025.
- Contributed Poster, “LAML-Pro: Cell Genotype and Lineage Inference via Efficient Maximum Likelihood.” Eric and Wendy Schmidt Center Symposium: Biomedical Science and AI. April 2025.
- Contributed Poster, “LAML: Lineage Analysis via Maximum Likelihood.” Computing Research Association – Widening Participation (CRA-WP). April 2025.
- Contributed Talk, “LAML: Lineage Analysis via Maximum Likelihood.” Cold Spring Harbor Laboratory (CSHL): Biological Data Science, Machine Learning Session. November 2024.
- Contributed Poster, “LAML: Lineage Analysis via Maximum Likelihood.” National Cancer Institute (NCI): Spring School on Algorithmic Cancer Biology (SSACB). April 2024.
- Contributed Poster, “SCAMPP+FastTree: Improving Scalability for Likelihood-Based Phylogenetic Placement.” International Society for Computational Biology (ISCB) – Latin America. October 2022.
- Contributed Talk, “User-guided local and global copy-number segmentation for tumor sequencing data.” Research in Computational Molecular Biology (RECOMB) – Computational Cancer Biology (CCB). May 2022.
- Contributed Poster, “MGDrive: Mosquito Gene Drive Explorer: Landscape Clustering.” National Conference on Undergraduate Research. March 2020.
- Invited Talk, “A Technical Overview of Blockchain Development.” TiE Inflect Silicon Valley. April 2018.

Teaching Experience

University of Illinois at Urbana–Champaign

- Intro to Programming for Engineers and Scientists (CS101). Graduate Student Instructor, Spring 2021. *Excellent Graduate Instructor Award*.

University of California, Berkeley

- Bioinformatics Bootcamp. Teaching Assistant, Center for Computational Biology. Aug 2020.
- Operating Systems and System Programming (CS162). Reader. Summer 2020.
- Efficient Algorithms and Intractable Problems (CS170). Undergraduate Student Instructor. Fall 2018, Spring 2019, Fall 2019, Spring 2020.
- Discrete Mathematics and Probability (CS70). Reader. Fall 2017, Spring 2018, Summer 2018.
- Building with Blockchain for Web 3.0. Guest Lecturer, IEOR. Spring 2020.
- Blockchain Fundamentals (CS198). Lecturer. Spring 2018, Fall 2018.
- Blockchain for Enterprise. Guest Lecturer, Haas Business. Spring 2019, Fall 2019.
- Blockchain for Lawyers. Guest Lecturer, Boalt Law. Spring 2018.
- EdX Blockchain Fundamentals. Course Advisor. Spring 2018.

Industry Experience

Databricks, San Francisco

May – Aug 2019

Software Engineering Intern, Observability Team

- Implemented distributed tracing for performance analysis across microservice architecture.

Sperax

Apr 2018 – Oct 2021

- Analyzed consensus protocols for distributed systems and implemented a test net.
- Designed Decentralized Autonomous Organization (DAO) voting protocol and modeled token economics.

Standard Bounties, ConsenSys

Jun – Aug 2018

Fullstack Software Engineering Intern

- Built out RESTful API and smart contract web application.

Office of Senator Maria Cantwell, Washington D.C.

Feb – Jun 2016

Legislative Intern

- Drafted policy memos and supported constituent communications and tours.

Professional and Community Service

- Panelist, “Imposter Syndrome,” LEAP Alliance: CMD-IT Webinar, April 2026.
- Panelist, “How to Make the Most of PhD Visit Day,” Code to PhD, March 2026.

Reviewer

RECOMB, ISMB, PLOS Computational Biology, ACM BCB, ECCB.

Mentorship

Undergraduates: Karina Macosko, Sophia Zhou, Sarah Koval.

Code2PhDVolunteer Mentor: <https://codetophd.github.io/>

Fall 2025

Computer Science Graduate Student Mentorship Program

Co-lead, Princeton University

Fall 2024 – Present

Computer Science Graduate Student Committee

Member, Princeton University

Fall 2022 – Present

Shield the Bay

Co-Founder / Finance, Berkeley, CA

Mar 2020 – Jun 2021

Berkeley ANova

Events Committee Chair, Berkeley, CA

Sept 2016 – Jun 2018

Skills and Languages

Programming: Python, Java, C, JavaScript, R, React, Redux, Solidity, Go, Jsonnet, Scala.**Tools/Frameworks:** HTML, Git, Django, Docker, AWS, Remix, CircleCI, Webpack, Jenkins, Kubernetes, Grafana.**Genomics:** samtools, bwa, GATK.**Languages:** English (native), Mandarin (fluent), Spanish (reading proficiency).